

Amendment to Specification:

Page 1, lines 1 through 19:

Cross-Reference to Related Applications

This application is a continuation-in-part of patent application Serial No. 09/877,518, filed 7 June, 2001 for AUTOMATIC CLUTCH WITH MANUAL OVERRIDE CONTROL MECHANISM and Application Serial No. 10/327,160, filed 20 December, 2002 for MULTI-ROW CAM-ACTUATED CENTRIFUGAL CLUTCH, both applications by Douglas W. Drussel and George Michael Wilfley, both being applications assigned to the assignee of this ~~invention~~ and incorporated by reference herein.

Background and Field of ~~Invention~~

This ~~invention~~ apparatus relates to centrifugal clutches and more particularly relates to a novel and improved centrifugal clutch which is capable of manual and automatic control of the maximum pressure exerted on the clutch plates when moved into the engaged position as well as the amount of pressure required to disengage the clutch plates.

Page 3, line 7 through Page 6, lines 24-25:

Summary of the ~~Invention~~

It is therefore ~~an object of the present invention~~ desirable to provide for a novel and improved clutch of a type which is capable of controlling the maximum pressure exerted on the

clutch elements while assuring non-slipping clutch engagement up to a predetermined force or pressure level as well as being manually controllable to disengage independently of the pressure control mechanism; further ~~It is another object of the present invention~~ to provide, in a centrifugal clutch of the type having an internal manual disengagement mechanism, for an automatic pressure control mechanism which will limit the maximum pressure to which the clutch elements can be subjected and without expanding the size of clutch housing required; and ~~A further object of the present invention is to~~ provide, in a motorcycle clutch, for non-slipping engagement under normal operating conditions while limiting the maximum pressure to which the clutch elements can be subjected in order to permit controlled slippage of the clutch elements when subjected to shock loads imparted through the drive train of the vehicle on which the clutch is mounted; and ~~It is a still further object of the present invention~~ to provide in a motorcycle clutch for a maximum pressure spring control mechanism of the type employing multiple, circumferentially spaced springs between a cover and retainer plate for the centrifugal clutch-actuating mechanism to limit the maximum amount of pressure applied to the clutch members and to mount same within a standard or stock motorcycle case.

~~The present invention resides~~ The features of one embodiment reside in a centrifugal clutch of the type having a plurality of cam members or balls interposed between a cover and pressure plate, the cam members being movable radially outwardly under centrifugal force to cause the pressure plate to move in a direction forcing the clutch members into clutching engagement, the

improvement comprising cam retainer means between the pressure plate and cover for retaining the cam members in one or more concentric rows whereby to guide inward and outward radial movement of the cam members, first fastener means for maintaining a predetermined spacing between the cover and the retainer means, second fastener means for maintaining a predetermined spacing between the pressure plate and retainer means including means resiliently biasing the pressure plate and retainer means toward one another, and a series of circumferentially spaced resilient biasing members interposed between the cover and retainer means and wherein the resilient biasing members are operative to undergo compression in response to continued radially outward movement of the cam members once the force exerted on the friction plates equals the force exerted by the resilient biasing members on the pressure plate and retainer means.

There has been outlined, rather broadly, the more important features of ~~the invention~~ one aspect in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of course, additional features ~~of the invention~~ that will be described hereinafter and which will form the subject matter of the claims appended hereto. In this respect, before explaining at least one embodiment ~~of the invention~~ in detail, it is to be understood that the ~~invention~~ embodiment is not limited in its application to the details of construction and to the arrangements of the components set forth in the following description. The ~~invention~~ embodiment is capable of other embodiments and of being practiced and carried out in various ways.

Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of description and should not be regarded as limiting. As such, those skilled in the art will appreciate that the conception, upon which this disclosure is based, may readily be utilized as a basis for the designing of other structures, methods and systems for carrying out the several purposes ~~of the present invention herein described~~. It is important, therefore, that the claims be regarded as including such equivalent constructions insofar as they do not depart from the spirit and scope ~~of the present invention thereof~~.

Brief Description of the Drawings

Figure 1 is a view partially in section of a centrifugal clutch for a motorcycle and illustrating the clutch in a disengaging position;

Figure 1A is a view in more detail of the maximum pressure wave springs employed ~~in accordance with the present invention~~;

Page 8, lines 6-9:

Figure 16 is a view partially in section of a modified ~~form of clutch in~~ accordance with the present invention.

Detailed Description of One Form of Invention

Page 10, line 23 through Page 12, line 2:

In ~~accordance with the present invention~~ one aspect, the cam faces 50 and 52 are in the form of pockets of generally oval-

shaped configuration indented in a flat surface of the movable cover portion 40 and are elongated in the radial direction. Similarly, the cam faces 46 and 48 in the pressure plate 30, as best seen from Figures 14 and 15, are in the form of radial pockets of generally concave configuration elongated in a radial direction and correspond in size and configuration to the aligned cam faces 50 and 52 in the retainer portion. However, the cam faces 48 in the outer row of the pressure plate 30 each terminate in flattened surface portions 49 so as to form a stop point at the outer peripheral edge of the pressure plate 30 to limit the travel of the cam members 44. Just inwardly of the inner row of cam faces 46, a plurality of circumferentially spaced counterbores 54 are aligned with bores 56 in the cover portion 38, the bores 56 being adapted for insertion of threaded fasteners in the form of shoulder bolts 58 between the cover portions 38 and 32 while leaving a predetermined spacing or clearance 60 between the cover portions for a purpose to be hereinafter described. It will be noted that the cover portion 38 is axially displaceable with respect to the threaded fasteners in the form of shoulder bolts 58 so as to move through the clearance space 60 in response to increased spreading forces applied by the balls 42 and 44 after the clutch plates 22 and 24 have moved into clutching engagement as will be later described with reference to Figure 3.

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A series of maximum pressure spring pairs 72, 72A are mounted between counterbored seats 74 in circumferentially spaced

relation to one another around the outer periphery of the cover portion 40 and aligned bores or spring seats 75 in the confronting surface of the cover 32. Preferably, the spring pairs 72, 72A are made up of inner and outer concentric SPIRAWAVE® wave springs as illustrated in the detail view of Figure 1A which in unison will be compressed as the pressure plate 30 and cover portion 40 are expanded to move the clutch plates 22 and 24 into engagement, as shown in Figure 2, until the clamping force exerted on the clutch plates 22 and 24 equals the resisting force exerted by the springs 72, 72A. Further, the clearance space 60 between the cover portions 32 and 40 will ~~move into engagement~~ engage or enable limited movement of the cam-actuating mechanism 28 away from the clutch portions 22 and 24 before the springs 72, 72A are compressed beyond their usable travel, which is the amount of deflection without permanent deformation of the springs 72, 72A.

Page 19, line 21 through page 21, line 8:

Modified Form of Invention Embodiment

A modified ~~form of invention~~ embodiment is illustrated in Figure 16 in which like parts are correspondingly enumerated to the preferred form of Figures 1 to 15. When employed in a motorcycle, a chain imparts rotation to drive sprocket 96 on clutch housing 97. A transmission shaft 101 is mounted for rotation by hub 102 when the clutch plates 22 and 24 are engaged; and through a transmission, not shown, is operative to rotate a belt or chain drive, not shown, to the rear wheel of the motorcycle. A starter gear 95 is operative to rotate the housing 97 and the drive

sprocket 96 which in turn rotates a crankshaft to start the engine. A pull rod or stem 98 is used in place of the push rod 18 and threaded stem 20 of the preferred form to manually disengage the clutch. Thus, the stem 98 is journaled to the cover portion 94 by a ball bearing assembly 99 which is mounted in the center of the pressure plate 100. The stem or control rod 98 may be directly controlled by a hand lever, not shown, in the same manner as the lever L of Figure 1.

Both with respect to the preferred and modified ~~forms of invention~~ embodiments, it will be appreciated that they are readily conformable for use in other applications than motorcycles and are adaptable for use in any application which employs an internal combustion engine, such as, for instance drag racing, cars, trucks, tractors, go-carts, cement mixers, all terrain vehicles, power tools including but not limited to chain saws and weed eaters and virtually any application in which an automatic clutch can be utilized.

It is therefore to be understood that while preferred and modified forms ~~of invention~~ are herein set forth and described, the above and other modifications may be made therein ~~without departing from the spirit and scope of the invention~~ as defined by the appended claims and reasonable equivalents thereof.